REMARKS

Claims 1-32 are presently actively pending in this application, and claims 7, 8, 19, and 20 are currently withdrawn pursuant to a restriction requirement. Claims 1, 5, 6, 8-13, 17, 18, and 20-32 have been amended. Claims 5, 6, 11, 12, 17, 18, 22, 23, 25, and 26 have been amended solely to change the antecedent basis of certain features of these claims, and as such these amendments were not made for the purposes of patentability. In the Office Action mailed October 18, 2004, claims 1-6, 9-18, and 21-32 were rejected under 35 U.S.C. § 102(b) as being anticipated by the European Patent Application No. 1,020,488 of Yano et al. ("Yano").

A. Response to the Section 102 Rejection of Claims 1-6, 9-18, and 21-32

Claims 1-6, 9-18, and 21-32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Yano. The standard for an anticipation rejection under Section 102 requires, among other things, that "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." (MPEP § 2131; emphasis added.) As discussed below, the applied reference Yano cannot support a Section 102 rejection of claims 1-6, 9-18, and 21-32 for at least the reason that this reference fails to teach or suggest each and every element as set forth in the claims.

1. Independent Claim 1 is Directed to an Abrasive Element for Use in a Liquid Planarizing Slurry Including, *Inter Alia*, a Core having an Exterior Surface and an Interior, and a Plurality of Abrasive Articles Partially Embedded into the Interior of the Core

Independent claim 1 is directed to an abrasive element for use in a liquid planarizing slurry used in chemical-mechanical planarization (CMP) of microfeature workpieces. As amended, claim 1 includes a core having an exterior surface and an interior. The core has a first hardness and is sized to be suspended in the liquid planarizing slurry. Claim 1 further includes a plurality of abrasive particles having a second hardness different than the first hardness of the core. The abrasive particles are partially embedded into the interior of the core.

2. Yano Discloses Composite Particles and a Process for Polishing Semiconductor Devices using the Composite Particles

Yano discloses composite particles for use in a CMP slurry. The individual composite particles include a polymer particle and at least one of a metal compound section and a silica particle section formed directly or indirectly on the polymer particle. (Yano, p. 3, lns. 19-22.) More specifically, Yano teaches that the composite particle are prepared by bonding a silane coupling agent to divinylbenzene polymer particles and then reacting a specific metal alkoxide, colloidal metal oxide, and colloidal silica therewith to form a metal compound section consisting of a metalloxane bond-containing section or metal oxide particle section on at least one of the interior and surface of the polymer particle. (Yano, Abstract; emphasis added.) The metalloxane bond-containing section and metal oxide particle section are bonded by chemical bonding and/or non-chemical bonding to the polymer particles using a silane coupling agent. (Yano, Abstract.)

3. Yano Cannot Support a Section 102 Rejection of Claim 1 for at least the Reason that this Reference Fails to Teach or Suggest Partially Embedding the Particles into the Interior of the Core

Claim 1 is patentable over Yano under Section 102 because this reference fails to disclose or suggest several claimed features. As set forth claim 1, the abrasive particles are "partially embedded into the interior of the core." In contrast to claim 1, Yano discloses that the metal compound sections are "on at least one of the interior and surface of the polymer particle." Thus, the metal compound section of Yano are either (1) completely inside the polymer particle, (2) attached to the exterior surface of the polymer particle, or (3) both inside the polymer particle and affixed to the exterior surface of the particle. Nowhere does Yano teach or suggest that abrasive particles are "partially embedded" into the core. Therefore, because Yano does not disclose or suggest all of the claimed features, the Section 102 rejection of claim 1 should be withdrawn.

Moreover, it would not have been obvious to modify Yano to come up with the claimed combination of elements. Before the present invention, it was expected that Composite Abrasive Slurries (CAS) would provide sufficient results in reducing defects and dishing for CMP processing. The CAS include a plurality of composite abrasive particles having cores with exterior surfaces and a plurality of abrasive particles. The abrasive particles are held to the exterior surface of the core by interaction forces, such as chemical bonding and/or electrical attraction forces. For example, the composite abrasive particles could be formed by chemically reacting the particles and a polymeric material to form a chemical bond. (Specification, p. 3.) This line of reasoning is supported by Yano, which discloses that compound sections may be formed by chemically reacting polymeric microspheres with specific metal alkoxide, colloidal metal oxide, and colloidal silica to form a chemical bond. Therefore, according to the general understanding in the art at the time of the invention, the CAS provided an advancement over existing planarizing solutions such that a person skilled in the art would not be motivated to partially embed abrasive particles into the cores of abrasive elements.

Conversely, the abrasive particles in the present invention are "partially embedded" into the core and are not as likely to be detached from the core compared to the composite particles of Yano and other conventional CAS. In fact, this is in direct contrast to the teachings of Yano, which provides that attaching the abrasive particles to the exterior surface of the core using chemical and/or non-chemical bonding is adequate. It is expected that partially embedding the abrasive particles into the core provides a more consistent polishing rate throughout a planarizing cycle because the abrasive particles stay attached to the core during the cycle. (Specification, p. 9-10.) Accordingly, it would not have been obvious to modify Yano to come up with the claimed features.

Claims 2-6 are allowable as depending from allowable base claim 1, and also because of the additional features of these dependent claims. Accordingly, the Section 102 rejection of claims 2-6 should be withdrawn.

Independent claims 9, 10, 13, 21, 24, and 27-32 include features generally similar to claim 1. For example, claim 9 includes a matrix material and a plurality of abrasive particles "partially surrounded" by the matrix material. Accordingly, claims 9, 10, 13, 21, 24, and 27-32 are patentable over Yano for at least the reasons discussed above regarding claim 1, and also because of the additional features of these claims.

Claims 11, 12, 14-18, 22, 23, 25, and 26 are allowable as depending from one of the allowable base claims 10, 13, 21, and 24, and also because of the additional features of these dependent claims. Accordingly, the Section 102 rejection of claims 11, 12, 14-18, 22, 23, 25, and 26 should be withdrawn.

Claims 7, 8, 19, and 20 were withdrawn from consideration on September 29, 2004 in response to a restriction requirement. These claims depend from generic independent claims 1 and 13. As discussed above, generic independent claims 1 and 13 are now allowable, therefore withdrawn claims 7, 8, 19, and 20 are presented for reconsideration.

Conclusion

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and are patentable over the applied art. The applicant respectfully requests reconsideration of the application and a mailing of a Notice of Allowance. If the Examiner has any questions or believes another telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-3982.

Respectfully submitted,
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